

## **REMARKS**

### **1. Status and Support for Amendments**

Claims 4 and 7-9 are cancelled. Claims 1-3, 5-6, 10-13, and 14-30 are currently pending and claims 5-6 and 13 are currently amended. Amendments to claims 5-6 and 13 are supported by the claims as filed and the specification as filed, in particular, see, paragraphs [0065] - [0068] and Figures 15 – 17. No new matter is introduced by the instant claim amendments.

### **2. Claim Objections**

Claims 5 and 6 are objected to as being dependent from a canceled claim. Claims 5 and 6 have been amended thereby obviating the objections. Therefore, Applicants respectfully request reconsideration and withdrawal of the objection.

### **3. Rejections under 35 U.S.C. § 112, second paragraph**

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Patent Office asserts that “[t]he meaning of the term 'discontinuous' in claim 13 as amended is unclear from the specification.” The Patent Office further notes that “for the purposes of examination, the examiner has examined claim 13 as ‘a semiconductor structure comprising: a Ge-Sn quantum...’” Claim 13 has been amended to recite “Ge-Sn quantum structure **islands dispersed** over a silicon substrate,” which is fully supported in the specification in Figures 15, 16 and 17 and in paragraphs [0068-0074], thereby obviating the rejection. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection.

### **4. Rejections under 35 U.S.C. § 102(b)**

Claims 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Soref et al. (U.S. 5,548,128).

According to M.P.E.P. 2131, “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art

reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

The Patent Office asserts that, with respect to claim 13, Soref et al. "discloses a semiconductor comprising a Ge-Sn quantum structure formed over a silicon substrate (col 2, lines 45-47)." However, Soref et al teaches continuous layers of  $\text{Sn}_{1-x}\text{Ge}_x$  (see, e.g., Figure 2 and Col. 2, ll. 35 – 40 and 41 – 58, and Col. 3, ll. 9 - 12) formed over a substrate. Claim 13 has been presently amended to recite "Ge-Sn quantum structure **islands dispersed** over a silicon substrate." Thus, Soref et al does not teach or suggest all of the claim limitations of claim 13 and thus, does not anticipate amended claim 13. Claims 14-15 are dependent on claim 13 and share the above limitations, and thus Soref et al also does not anticipate claims 14-15. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection.

## **5. Rejections under 35 U.S.C. § 103(a)**

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soref et al. (U.S. 5,548,128) as applied to claim 13 above, and further in view of Yamauchi et al. (2003/0219933 A1).

In order to establish a *prima facie* case of obviousness the Patent office must establish three criteria; 1) a suggestion or motivation found within the prior art or within the knowledge of one of skill in the art to combine or modify the references; 2) a reasonable expectation of success; and 3) the prior art references alone or in combination must teach or suggest **all** the claim limitations. MPEP § 706.02(j).

The Patent Office asserts that, regarding claim 16, "Soref et al. discloses the limitations of claim 13 and the use of a silicon substrate but does not disclose that the substrate comprises Si(100)." Claim 16 is a dependent claim of presently amended Claim 13. Claim 13 is presently amended to recite "Ge-Sn quantum structure **islands dispersed** over a silicon substrate." As noted above, Soref only teaches continuous layers of  $\text{Sn}_{1-x}\text{Ge}_x$  (see, Abstract and as illustrated in Figures 1 and 2). Thus, Soref et al. does not teach, suggest, or make obvious all of the limitations of claim 13 and dependent claim 16.

With respect to Yamauchi et al. the Patent Office asserts that the reference “discloses that the use of an Si(100) substrate is desirable because an epitaxially grown film formed over such a substrate has a better crystallographic structure as compared to those films formed on other types of substrates ([0083]).” However, Yamaguchi et al. is silent with respect to SnGe layers as recited in independent claim 13, and does not cure the deficiencies of Soref et al. Thus, the combination of Soref et al. and Yamaguchi et al. does not teach, suggest or make obvious all the present limitations of independent claim 13 and dependent claim 16. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection.

#### **6. Non-statutory Double Patenting**

Claims 17-23 and 29 are rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-25 of U.S. Patent No. 7,238,596 B2. The Applicants are herewith filing a terminal disclaimer to obviate the rejection. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection.

#### **7. Allowed Claims**

The Patent Office has indicated that claims 1-3, 10-12, 24, and 25-28 are allowed.

#### **Conclusion**

Based on all of the above, the Applicants believe the claims are now allowable. If there are any questions or comments regarding this response, the Patent office is encouraged to contact the undersigned agent as indicated below.

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Respectfully submitted,

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